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ABSTRACT

The demographics of the population 65 years and older are described within the context of attitudes toward aging prevalent in society today. A description is presented of the physical signs of aging. The benefits of exercise are discussed as well as the importance of proper nutrition. Suggestions are listed regarding diet and exercise. A bibliography is included. (JD)

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COMBATING THE DILEMMA OF AGING

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

The first sign of old age is when you hear "snap, crackle, and pop" in the morning, and it's not your breakfast cereal. Or, you may feel dyspeptic and believe you have a vitamin deficiency. Cheer up, you're just getting older, and joining the fastest growing sector of the American population.

Demographics. The fastest growth of a specific age population is the 65 years and older group. Since the beginning of this century, the 65-74 yrs. age group (16.4 million) has increased seven-fold. The 75-84 age group (8.5 million) has increased 11 times, and the 85 and above age group (2.5 million), 20 times. From 1980 to 1983, older adults increased 6 per cent compared to a 3 per cent increase for the under-65 population. In 1983, our senior adults, defined as 65 years of age and above, numbered 27.4 million and represented 11 per cent of the U.S. population. That's about one in every nine Americans. By the year 2000, persons aged 65 ys. plus are expected to represent 13 per cent of the population and climb to 21 per cent by the year 2030. That represents about 65 million old persons, which is approximately 2.5 times the figure of 1980 (Bureau of the Census, 1984).

Statistics on aging bear serious implications for the physical education, health, and recreation professions. The figures give meaning to the statement, "if I knew I was going to live this long, I would have taken better care of myself." In Ecuador, there are claims about people who have lived to be 150. The longest lived we found record of, however, was Medzhid Agayev, who died in 1978 in Russia at the age of 143 years. In remote villages in the Andes, people are still working at the age of 70.

The human life span should be 120 years of age. In our country, however, many take their health for granted until something fails to function. It is only then that they realize that their life style is what is killing them.

Seneca once stated (c.a. 65 A.D.) that "man does not die, he kills himself." Does Seneca's observation hold true today? Look around and see if you agree. We eat overprocessed, undernutritious foods--and eat too much. We live complex lifestyles, adhere to rigid time schedules, smoke too much, drink too much, and play and exercise too little.

In a nation supposedly advanced, why is it that 7 of the 10 leading causes of death are lifestyle related? Dr. Leslie Breslow of U.C.L.A. concluded that an individual aged 45 years who observes five simple health practices--not smoking, using alcohol in moderation, eating a proper, balanced diet, getting enough rest and exercising regularly-

can expect to live ten or more years longer than an individual who does not monitor these habits. There is no guarantee, of course, but the odds certainly are better.

An hour spent in exercise not only improves vigor, but is believed to increase one's life span by that same duration. Yet, according to Casey Conrad of the President's Council for Physical Fitness and Sports, older persons commonly carry the following four misconceptions about exercise:

(1) They believe the need for exercise diminishes.
(2) They exaggerate the risks involved.
(3) They over-rate the benefits of light, sporadic exercise.
(4) They under-rate their own abilities.

These popular misconceptions enable a person to rationalize, to mislead themselves, concerning exercise programs.

Definition. Aging is the process of growing old, and begins at conception--even though it is customary to think of birth, growth, maturity, and aging separately. Really, aging is programmed at birth. Just as one has his/her own schedule of growth and development, each has her own "biological clock" of aging.

Signs of Aging. Signs of aging appear between 30 and 40 yrs. of age, sometimes prematurely. Graying hair, arcus senilis (a cloudy ring around the cornea), a decline in all five senses in that increased stimulation is needed for response.

Eyes lose the ability to adapt and more light is required for reading. Bifocals may be necessary. Dryness is more prevalent. More floaters appear.

Some loss of hearing, especially of high frequencies,is common.

There is a loss of ability to detect some odors.

There is an inability to discern flavors as distinctly as before.

By 80 yrs. of age, there is considerable loss of muscle and bone.

The reproduction of cells, e.g. skin cells, is imperfect. At age 40 in women, and later in men, oil glands decrease their secretions so that the skin becomes drier. Since sebaceous gland secretions slow the evaporation of moisture and help to maintain the body's water content, there is a greater consequent danger of dehydration and susceptibility to heat illnesses. Also, skin is more easily cut or burned, and takes longer to heal.

Many of the changes in skin, however, are the results of exposure to the sun; among these are thought to be wrinkles, spots, and small growths. The skin when shielded from the sun stays smoother for longer.

Some cells, e.g. the brain, can never reproduce themselves, leaving loss of memory.

Such are the primary effects of aging, which are similar to those of a sedentary lifestyle. As one becomes older, one generally becomes less and less active. There is less demand on muscles and organs to function toward their optimal efficiency, which results in one or more of these common signs and symptoms of aging:

Lag, often referred to as mid-day lag (undue tiredness)
tired and aching legs
Loss of muscle tone, flabbiness, forward drooping of the shoulders, protruding abdomen, hollow back, in general, a poor posture
Lessened flexibility
Aching back
Accumulation of body fat
High blood pressure
Reduced agiligy
Poor balance
Soreness of major muscles from physical work
Diminished coordination of movement and endurance
Weakened heart
Reduced blood circulation
Less resilience of arteries and veins
Reduced breathing capacity typified by breathlessness from minor activity.

Our ability to do physical work declines; we become less adaptable, We do not bounce back as quickly as the young after we have exerted ourselves physically. As far as sports performances are concerned, factors contributing to success such as reaction time, strength, endurance, and flexibility rise and fall with advancing age and peak at different times. Championship or peak performance in a sport requires a certain combination of such traits or abilities, different for each sport.

In swimming, peak years are very short, around 15-16 years of age (Baker, 1982). On the other hand, a person can continue participating in swimming past 80 years of age, depending upon time factors, facility availability, personal health and desire. This is true for many other activities, as well. Budgeting time and availability of partners mitigate away from team sports in the post-school years towards individual activities or those that require only one partner, e.g. swimming, jogging, racquetball, tennis, or badminton. Then, too, the ability to vary the sport to fit in with your (declining) level of performance is less for team sports than for individual sports and pasttimes. While in a basketball game one has to adapt to the younger, swifter athlete, a person can swim, jog, or ski at their own speed and feel okay about it. Adherence to individual sports is better as a consequence of these differences.

When difficulties arise in keeping up with the team, the response may be to give up, change to another team sport, or go into coaching.

Men peak in maturity at age 30 years, and decline at the rate of three-fourths of a percent each year from then to age 70 years. There is a thirty percent reduction in work capacity in both men and women during the same time span. Muscle mass and strength decrease 25 to 30 percent, with the sharpest fall occurring after age 50. Slower nerve conductance and cellular changes produce a net loss in reaction time, and in speed. Metabolism decreases ten percent, although our eating habits remain the same, thus adding to the tendency to gain body fat. Heart output decreases 30 percent. Blood pressure increases ten to fifteen percent, affecting stamina, partly due to decreased elasticity of the blood vessels and to an associated increase in resistance to blood flow. Liver and kidney function decrease 15 to 30 percent. A 40 to 50 percent loss in lung function means the amount of air that can be moved in and out of the lungs falls and the dead air space expands. Our bones become more brittle as three fourths to one percent of the solids are resorbed each year through osteoporosis. Cartilage becomes cracked, frayed and compressed. Joint synovial fluid becomes thinner and connective tissue becomes stiffer, the net result of these changes reflected as osteoarthritis and affecting four out of five men and women in the 55 to 64 age bracket. Then there are the secondary effects of aging: emphysema, diabetes (from hormonal changes), and heart disease--which become increasingly prevalent.

Benefits of Exercise.

The outlook is downright depressing unless you understand and appreciate that the same research which so fully ennumerated our rate of decline also maintains that half of the changes attributed to aging are actually the result of inactivity, including what we have previously identified as disuse atrophy. Moreover, many of these negative changes can be reversed through the proper type and amount of physical exercise.

"That which is used develops," said Hippocrates. Parts of the body will become stronger and more efficient when repeated demands are placed upon them. We know this today as the principles of specificity and overload. The principle of specificity states that the body will respond and develop to meet the specific demands placed upon it. The circulatory system, for example, will improve in response to a running program. The musculo-skeletal system will strengthen to equal the loads imposed in a weight lifting program. The overload principle tells us that in order to provide a training stimulus, the load on a system

or body part must be greater than that to which the system or part is accustomed. If we walk more than we're used to walking, we'll soon find walking easier--and more enjoyable.

The good news is that through applying the principles of specificity and overload in an exercise program, we will see an overall training effect that becomes manifest as improved physical fitness. Some of these changes, which are directly opposed to those previously cited as part of the aging process or disuse atrophy, are as follows:

Strengthened connective tissue surrounding joints attaching muscle to bone, and bone to bone
Thickened, more resilient cartilage
Improved muscle tone, strength, and endurance
Stronger heart muscle
Better supply of blood to heart muscle through improving coronary blood vessels
More blood pumped pr beat, and consequently fewer beats per minute at rest or at a constant workload
Lower heart rate at rest and at maximal exertion, indicating improved cardiac efficiency
Fewer deposits of fat and fatty placques in the blood vessels, including the dissolving of those that were presetn
Improved blood supply to working muscles
Greater elasticity of blood vessels, with less scar tissue and hardening
Improved loading of the blood with oxygen
Improved carrying capacity of the blood for oxygen, carbon dioxide, and nutrients.

In short, efficiency will be improved so that the same work can be accomplished with less energy, and more work can be performed than before.

Relating to aging, the American Medical Association stated years ago (Bauer, 1959) that there is good reason to believe that proper physical activity can significantly delay the aging process. Regular and proper exercise can help to preserve physical and mental capacities longer than otherwise.

Relating to the heart, proper exercise as a way of life helps to keep healthy hearts healthy, preventing the onset or delaying the progress of cardiovascular disease. Proper exercise as a way of life may help to lessen the severity of and increase chances of recovery from a heart attack.

Relating to weight, the problem of obesity begins early in life and is as much a problem of underactivity as of overeating.
Physically active people in middle age will have substantially less body fat than a comparable group of inactive persons of similar age and weight.

Diet and Nutrition.

When one talks about nutrition, there are two primary concerns. The first is, are there any nutritional considerations that can increase longevity? Can we, in fact, alter the aging process by the way we eat? The second question is, given the fact that all of us are going to age, is there any specific way in which we can feed older individuals so as to improve the quality of their lives? The answer to both questions is yes.

Nutritional components of certain diseases are the main cause of a shortened lifespan. Such diseases can be divided into those associated with overnutrition and those associated with undernutrition. Overnutrition is a health risk in that it leads to obesity, which in turn is asssociated with increased incidence of high blood pressure, diabetes, and coronary artery disease. These diseases are more prevalent in men than in women, and probably account for the majority of the difference in lifespan between men and women. Thus, while women may be more concerned about their weight, the consequences of overeating historically have taken a greater toll among men.

Regardless of whether our diets contain too much or too little, too much dietary fat can lead to real problems. More fat is ingested by Americans than in many countries throughout the world. And, the amount of fat in the diet, particularly saturated fat, is correlated with the amount of lipids in the blood. Higher levels of fat or lipids in the blood are associated with higher levels of saturated fat and cholesterol in the diet. Similarly, the levels of lipids in the blood are directly correlated with the incidence of heart disease. By reducing the amount of saturated fat, therefore, we reduce the amount of cholesterol in the blood and the incidence of coronary artery disease.

There is some evidence that total fat in the diet may be associated with two different kinds of cancer, both also contributing to reduced lifespan. One is cancer of the colon, and the other is cancer of the breast.

Too much salt in the diet is also a problem. There are data from both animal and human studies that demonstrate quite clearly how salt content is directly related to hypertension or high blood pressure. In animals, one can breed genetic strains that become hypertensive only if exposed to a high salt diet. In human populations where salt is not a major component of the diet, there is no relationship between blood pressure and aging. Reducing salt intake in our diets may be accomplished by restricting consumption of such foods as canned soups, condiments, snack foods, luncheon meets, cheese, pickles, and olives.

Problems of undernutrition may be not eating, not eating enough, or not eating enough of the right kinds of food. Women in our society seem to be afflicted by undernutrition more so than are men. There's good reason. Women consume fewer calories and therefore fewer nutrients. They then must satisfy their nutrient requirements, which are not fixed on a per calorie basis but on a per person basis, from a lesser amount of food. Second, for certain nutrients, women's requirements fluctuate enormously during the changing cycles of their lives. Many women begin their senior years with low reserves of iron.

The other mineral most often found to be deficient is calcium. The amount of calcium in the diet is important, but not just the amount in food; the important concern is how much calcium actually is absorbed and used in the body. This amount is determined by protein and phosphorus in the diet, both of which, in excess, will decrease calcium absorption. The American diet generally is too high in animal protein and too high in phosphorus from certain soft drinks. From a nutritional standpoint, it is better to consume less protein and phosphorus.

Suggestions Regarding Diet and Exercise.

A. Regarding diet.

1. Vitamin D supplements are necessary in the elderly, expecially during the winter months. The recommended amount is 200-400 I.U. daily.

2. Calcium. Pre-menopausal women need 1000 mg. of calcium per day; post-menopausal, 1500 mg./day.

3. Drink water! Elderly individuals have smaller fluid volumes and become dehydrated more quickly. The consequence is lower tolerance to heat, and a greater risk of heat illnesses, e.g. heat exhaustion or sun stroke.

4. Tomato juice followed by a glass of water has been found by runners to be an excellent replacement of electrolytes lost during exercise or to profuse perspiration, and hence is an elixer worthy of recommending to senior citizens.

5. Some soft drinks, through their high phosphorus content, rob the body of calcium. Caution should be observed by limiting the number of soft drinks ingested per day, or by avoiding them completely.

6. Older persons require fewer calories per day for several reasons. Resting metabolism is lower and activity levels are less, meaning fewer calories are needed

each day than was the case during one's earlier years. The excess food will be stored as fat, thereby increasing the relative proportion of fat to lean tissue, with creeping obesity the progressive result.

B. Regarding exercise.

1. A medical exam is recommended, including a stress electrocardiogram, for the previously inactive before such an individual engages in unaccustomed exercise.

2. A physical fitness profile is desirable, such as are performed commonly in exercise physiology laboratories at colleges, universities, and wellness centers.

3. Heart rate monitored exercise is an excellent approach to the activity needs of the older adult. Immediate post exercise heart rate is taken to establish working heart rate. DeVries (1985) recommends a 15 second count beginning only 5 to 10 seconds after exercise has ceased, taken at the radial artery. Such a count gives an accurate estimate, because heart rate recovery is not as rapid in the aged as in younger adults.

4. The threshhold heart rate for a physiological training effect in older people is only 30 percent of their heart rate reserve. This heart rate is best achieved through a balanced program including walking and/or jogging.

5. Warm up is important, as is a gradual progression in exercise intensity from day to day.

6. Use a type of exercise that is within tolerance, appreciating that walking has least cardiac stress, bicycling moderate, and crawling exercises have the most cardiac involvement. Jogging may be a no-no for those unaccustomed to exercise. Rope skipping is not evenly graded in exercise intensity, and probably will be too strenuous.

7. Exercises should be performed regularly to receive benefit and to avoid the miseries of the week-end athlete. Older persons can do many things the younger can do, such as ski, and so on, but need mid-week exercise to prepare for week-end activity.

8. To decrease osteoporosis, stress each part of the body, such as in calisthenic type exercises. Stress will increase bone mineralization.

The elderly can do much more than bed or chair exercises. Attitude and loneliness are significant barriers

to an older person's becoming involved in an exercise program, however.

"We get too soon old, and too late smart" is an old German saying. Perhaps we finally are getting smart regarding the importance of exercising so that we will not get so soon old! We have learned that exercise contributes toward physical fitness and high-level wellness. We acknowledge that physical fitness is necessary for healthy growth and development in the young, for optimal functioning at all ages, and for significantly delaying the onset and progress of aging.

A Few Appropriate Anonymous Quotes.

"The older I grow, the more I distrust the familiar doctrine that age brings wisdom."

"The best thing about getting old is that all those things you couldn't have when you were young you no longer want."

"Old age is when you know all the answers but nobody asks you the questions."

"You've got to be fifty-nine years old t'believe a feller is at his best at sixty."

"I'll never make the mistake of bein' seventy again."

"If I Had My Life To Live Over Again"

If I had my life to live over,
I'd dare to make more mistakes next time.
I'd relax, I would limber up.
I would be sillier than I have been this trip.
I would take fewer things seriously.
I would take more chance.
I would climb more mountains and swim more rivers.
I would eat more ice cream and less beans.
I would perhaps have more actual troubles, but I'd have
Fewer imaginary ones.

You see, I'm one of those people who live sensibly and
Sanely hour after hour, day after day.
Oh, I've had my moments, and if I had it to do over again,
I'd have more of them.
In fact, I'd try to have nothing else.
Just moments, one after another, instead of living so many
Years ahead of each day.

I've been one of those persons who never goes anywhere
Without a thermometer, a hot water bottle, a raincoat and a
Parachute.
If I had to do it again, I would travel lighter than I have.

If I had my life to live over, I would start barefoot
Earlier in the spring and stay that way later in the fall.
I would go to more dances.
I would ride more merry-go-rounds.
I would pick more daisies.

(Nadine Starr, 85 years old, Louisville, KY.)

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